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Applicant	:	**Van Steenkiste et al.**		
Serial No.	:	**10/812,861**	**: Group:**	**1762**
Atty. No	:	**DP 308959**	**: Examiner:**	**Bareford, K.A.**
Filed	:	**March 30, 2004**	**: Confirmation No.**	**3460**
Title	:	**KINETIC SPRAY APPLICATION OF COATINGS ONTO COVERED MATERIALS**		

BRIEF ON APPEAL

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

Subsequent to the filing of the Notice of Appeal dated August 4, 2005 and acknowledged by the OIPE, Applicants now submit a brief in support of the appeal in response to the Final Rejection set forth in the Office Action dated May 4, 2005. A single copy of this Appeal Brief is being submitted in accordance with 37 C.F.R. §41.37 and this Appeal Brief is accompanied by the required fee of $500.00 under §41.20(b).

The Patent Office is authorized to charge or refund any fee deficiency or excess to Deposit Account No. 08-2789.

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I. Real Party in Interest

The inventors assigned this application to the real party in interest Delphi Technologies, Inc. as evidenced by an assignment recorded at reel 015693, frame 0865.

II. Related appeals and interferences

There are no related appeals or interferences.

III. Status of claims

Claims 1 and 12 have previously been presented in the response after the final rejection of May 4, 2005 and where entered by the Examiner for the purposes of this appeal. Claims 2 - 9, 11, 13 - 18, and 20 - 22 are in original form. Claims 10 and 19 have been cancelled. Claims 1 - 9, 11 – 18, and 20 - 22 have been finally rejected under 35 U.S.C. §103 and are on appeal. A set of the claims on appeal is found in the claims appendix.

IV. Status of amendments

All amendments have been entered and are reflected in the claims in the claims appendix.

V. Summary of claimed subject matter

A. Independent claim 1

Claim 1 is directed to kinetic spray method for coating a substrate that is covered by a plastic-type material with particles having an average nominal diameter of from 60 to 250 microns without the need to remove the plastic-type covering as in the prior art. The method makes use of a kinetic spray system in conjunction with a mask. The claim requires providing particles of the coating material having an average nominal diameter of from 60 to 250 microns. A provided supersonic nozzle has a converging region connected to a diverging region by a throat. The substrate material is covered in a plastic-type material and placed opposite the nozzle. A mask having at least one opening is placed between the nozzle and the substrate and pressed against the plastic-type material. A flow of heated main gas is passed through the nozzle and entrains the particles in its flow. The particles are accelerated to a velocity sufficient to pass through the opening in the mask, remove the plastic-type material and bind to the underlying substrate upon impact. The substrate and/or the nozzle are moved relative to the other at a traverse speed of from 70 to 260 millimeters per second. The present invention eliminates the prior art need to carefully remove the plastic-type material prior to coating the substrate. It enables very precise electrical connections and contacts to be formed at very high speeds. The specific limitations of independent claim 1 and the support for each in the specification are provided below in Table 1.

TABLE 1

Claim 1 limitations	Support for the limitation in the specification
A method of kinetic spray coating a	

substrate (116) covered by a plastic-type material (112, 114) comprising the steps of: a) providing particles of a material to be sprayed having an average nominal diameter of from 60 to 250 microns;	Support for the particle size limitation in this claim can be found in the Abstract, paragraph [0006], paragraph [0018], paragraphs [0030] through [0033], Table 3, and figures 5 – 7. These sections all discuss use of particles of this size in the invention.
b) providing a supersonic nozzle (54) having a converging region (56) connected to a diverging region through a throat (58);	Support for this limitation of the supersonic nozzle can be found in paragraphs [0006] and [0020] of the specification and figure 2.
c) providing a substrate material (116) covered by a plastic-type material (112, 114) and positioned opposite the nozzle (54);	Support for this limitation can be found in paragraphs [0006], [0030], [0031], and the abstract.
d) providing a mask (118, 122) having at least one opening (120) therein, pressing the mask (118, 122) against the plastic-type material (112, 114);	Support for this limitation can be found in paragraphs [0006], [0030] through [0033], and the abstract.
e) directing a flow of a heated main gas through the nozzle (54); and	Support for this limitation can be found

.	in paragraphs [0006], [0019] through [0023], and figure 2.
f) kinetic spraying the particles by entraining the particles in the flow of the heated main gas and accelerating the particles to a velocity sufficient to result in the particles passing through the opening (120) in the mask (118,122) and removing the plastic-type material (112) and then adhering to the substrate material (116) upon impact, wherein one of the substrate material (116) and the nozzle (54) are moved relative to the other of the substrate material (116) and the nozzle (54) at a traverse speed of from 70 to 260 millimeters per second.	Support for this limitation can be found in paragraphs [0006], [0024], [0031], Table 3, and figures 5 – 7.

B. Independent claim 12

Claim 12 is directed to a kinetic spray method for coating a substrate that is covered by a plastic-type material with particles having an average nominal diameter of from 250 to 1400 microns without the need to remove the plastic-type covering as in the prior art or use of a mask. The method makes use of a kinetic spray system without a mask material. The claim requires providing particles of the coating material having an average nominal diameter of from 250 to 1400 microns. A provided supersonic nozzle has a converging region connected to a diverging region by a throat. The substrate material is covered in a plastic-type material and placed opposite the nozzle. A flow of heated main gas is passed through the nozzle and entrains the particles in its flow. The particles are accelerated to a velocity

sufficient to pass through the plastic-type material and bind to the underlying substrate upon impact. The substrate and/or the nozzle are moved relative to the other at a traverse speed of from 70 to 260 millimeters per second. The present invention eliminates the prior art need to carefully remove the plastic-type material prior to coating the substrate. It enables very precise electrical connections and contacts to be formed at very high speeds. Because of the size of the particles a single particle can pass through the plastic-type material and form and electrical path from the substrate to outside the plastic-type material. The specific limitations of independent claim 12 and the support for each in the specification are provided below in Table 2.

TABLE 2

Claim 12 limitations	Support for the limitation in the specification
A method of kinetic spray coating a substrate (86, 92) covered by a plastic-type material (82, 84, 90) comprising the steps of: a) providing particles of a material to be sprayed having an average nominal diameter of from 250 to 1400 microns;	Support for this limitation can be found in paragraphs [0007], [0018], and [0025] through [0029], and Tables 1 and 2.
b) providing a supersonic nozzle (54) having a converging region (56) connected to a diverging region through a throat (58);	Support for this limitation can be found in paragraph [0020] and figure 2 of the specification.

c) providing a substrate material (86, 92) covered by a plastic-type material (82, 84, 90) and positioned opposite the nozzle (54);	Support can be found in paragraphs [0007], [0025] through [0029], and the abstract.
d) directing a flow of a heated main gas through the nozzle (54); and	Support for this limitation can be found in paragraph [0007].
e) kinetic spraying the particles by entraining the particles in the flow of the heated main gas and accelerating the particles to a velocity sufficient to result in the particles passing through the plastic-type material (82, 84, 90) and adhering to the substrate material (86, 92) upon impact, wherein one of the substrate material (86, 92) and the nozzle (54) are moved relative to the other of the substrate material (86, 92) and the nozzle (54) at a traverse speed of from 70 to 260 millimeters per second.	Support for this limitation can be found in paragraphs [0007], [0024] through [0029], figures 3 and 4, Tables 1 and 2, and the abstract.

VI. Grounds of rejection to be reviewed on appeal

The Examiner rejected claims 1-6 and 9-11 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste et al. (US 6283386) and Hathaway (US 2599710). The Examiner further rejected claim 7 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste et al. (US 6283386), Hathaway (US 2599710), and Martyniak (US 4263341). The Examiner rejected claim 8 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste et al. (US 6283386), Hathaway (US 2599710), and Kashirin et al. (US 6402050).

Additionally, the Examiner rejected claims 1-6 and 9-11 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste (US 6623796) and Hathaway (US 2599710). The Examiner further rejected claim 7 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste (US 6623796), Hathaway (US 2599710), and Martyniak (US 4263341). The Examiner rejected claim 8 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste (US 6623796), Hathaway (US 2599710), and Kashirin et al. (US 6402050).

The Examiner rejected claims 12-16 and 18-20 under 35 U.S.C. § 103(a) as unpatentable over Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), and Van Steenkiste (US 6623796). The Examiner rejected claim 17 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste (US 6623796) and further in view of Kashirin et al. (US 6402050). Finally, the Examiner rejected claims 21-22 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste (US 6623796) and further in view of Martyniak (US 4263341).

VII. Argument

A. Rejection of claims 1-6 and 9-11 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste et al. (US 6283386), and Hathaway (US 2599710).

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching, suggestion, or motivation that would lead one of ordinary skill in the art to combine the cited references. *In re Sang Su Lee*, 277 F.3d 1338, 1343 ; 61 USPQ2d 1430, 1433 (Fed. Cir. 2002). "[T]he factual inquiry whether to combine references must be thorough and searching." *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351-52, 60 USPQ2d 101, 1008 (Fed. Cir. 2001). Elements of separate prior patents cannot be combined when there is no suggestion of such combination anywhere in those patents. *Panduit Corp. v. Dennison Mfg. Co.*, 818 F.2d 876, 1 USPQ 2d 1593, 1597 (Fed. Cir. 1987). *See also In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir.1999); *Arkie Lures Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 957, 43 USPQ2d 1294, 1297 (Fed. Cir. 1997). The U.S. Court of Appeals for the Federal Circuit recently made the following statements in *Yamanouchi Pharmaceutical Co., Ltd. v. Danbury Pharmacal, Inc.*, 231 F.3d 1339, 1343, 56 USPQ2d 1641, 1644 (Fed. Cir. 2000), *citing In re Rouffet* , 149 F.3d 1350, 1357-58, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998) (internal citations omitted) concerning the combination of old elements: .

> "virtually all [inventions] are combinations of old elements." Therefore, an Examiner [or accused infringer] may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate the patentability very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner [or

> accused infringer] to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention.
>
> ...
>
> ...To counter this potential weakness in the obviousness construction, the suggestion to combine requirements stands as a critical safe guard against hindsight analysis and rote application of the legal test for obviousness. [Emphasis added]

Further, when claimed subject matter has been rejected as being obvious in view of a combination of prior art references a proper analysis under section 103 requires a consideration of two factors: [1] Whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and [2] whether the prior art would also have revealed that, in so making or carry out , those of ordinary skill would have a reasonable expectation of success. *In re Vaeck*, 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991), *citing In re Dow Chemical Company*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). Both the suggestion and the reasonable expectation of success must be found in the prior art not in the applicant's disclosure. *Id.* The mere fact that the prior art can be modified does not make the modification obvious unless prior art taught or suggested the desirability of the modification. *In re Gordon,* 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984).

Obviousness may not be established by hindsight. *Kahn v. General Motors Corp.*, 135 F.3d 1472, 1479, 45 USPQ2d 1608, 1613 (Fed. Cir. 1998). Determination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention. *In re ATD Corp v. Lydal, Inc.*, 159 F.3d 534, 546, 48 USPQ2d 1321, 1329 (Fed.Cir.1998). Combining prior art

references without evidence of a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability-the essence of hindsight. *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). The prior art must suggest to one of ordinary skill in the art the desirability of the claimed combination. *In re Fromsom v. Advanced Offset Plate Inc.*, 755 F.2d 1549, 1556, 225 USPQ 26, 31 (Fed. Cir. 1985). Good ideas may well appear "obvious" after they have been disclosed after despite having been previously unrecognized. *In re Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 956, 43 USPQ2d 1294, 1296 (Fed. Cir. 1997).

In making the rejections of claims 1-9 and 11 under 35 U.S.C. § 103 (a) the Examiner has failed to point any specific teaching, suggestions, or motivations found within the references themselves for combining the references and then for modifying the teachings to make applicant's invention obvious. What the Examiner has done is take the Applicants' invention and use it as a blueprint for finding the six cited references, this is impermissible hindsight. The cited references can not properly be combined and even when combined they do not make the present invention obvious.

The primary reference, Rayburn, teaches a method for making a multilayer plastic chip capacitor that includes a thermal spraying step. The thermal spraying is used to form a contact between alternate electrode layers which extend to a common end of the capacitor to place all of the electrodes in the electric field. Column 1, line 59 through column 2, line 8. The molten aluminum "embeds itself in the plastic coatings between the metalized layers so as to contact the surface as well as the ends of the electrodes, but does not substantially penetrate the plastic dielectric strip". Column 2, lines 2-5. The form of thermal spraying of metals onto metal as disclosed in Rayburn relies on using an oxygen-acetylene flame to melt an aluminum wire. The molten aluminum is then broken up into molten droplets using a high velocity air stream and the

molten droplets are directed toward a substrate. This thermal spray process is completely the opposite of the kinetic spray method used in the present invention.

All thermal spray processes include a spray system that performs different functions in a completely different way to achieve a different result from the kinetic spray systems as used in the present invention. The cited references Rayburn, Tawfik et al., Martyniak, and Hathaway are all thermal spray systems. Common to all thermal spray systems is the concept of heating a material to be sprayed to a temperature well above its melting point to produce a molten material. The molten material is then sprayed at a substrate surface while it is still molten where it will bind to the surface as it cools and resolidifies. All thermal spray processes are high temperature processes. Kinetic spray processes are low temperature processes wherein the particles being sprayed are never heated to a temperature anywhere near their melting temperature. Instead kinetic spray relies on the principal of accelerating the particles to a velocity above their critical velocity and using the generated kinetic energy of the particles to cause a bond between the substrate and the particle when the particle strikes the substrate. In a kinetic spray process the physical state of the particles never changes where as in a thermal spray process the particles do change their physical state. Because these processes are fundamentally different the teachings of Rayburn, Tawfik et al., Martyniak, and Hathaway with respect to a thermal spraying process are inapplicable to the present invention.

The Examiner admits that Rayburn does not teach any of the kinetic spray features including the traverse speed that are recited in claim 1 nor does Rayburn teach the masking as required by claim 1. In fact, Rayburn teaches nothing that is relevant to the invention as claimed in claim 1 and it teaches away from the kinetic spray method as recited in claim 1. Any removal of plastic in Rayburn is due to the high temperature of the molten aluminum, which must be above 660° C the melting temperature of aluminum.

Tawfik et al. teaches a method of coating a metal substrate directly with a metal corrosion resistant layer, again by using a thermal spray process. In passing Tawfik et al. suggests that cold gas dynamic spraying may be useful to coat a metal with a metal when one is concerned about thermal distortion of the substrate. Tawfik et al., however does not disclose any details of a kinetic spray process. As stated in paragraph [0039] of Tawfik et al. "[t]hus, the inventive bipolar plate 10 is an all-metallic structure including the metal substrate layer, the corrosion resistant layer formed in the boundary region or interface". Thus, Tawfik et al. like Rayburn, at most teaches a thermal spray method for coating a metal with a metal. Only in passing does Tawfik et al. mention use of kinetic spray to coat a metal substrate with a metal. The Examiner suggests Tawfik et al. teaches using kinetic spraying when embedding particles into a substrate like plastic to avoid overheating as caused by thermal spraying, however, even if this were what Tawfik et al . taught it is inapplicable to the present invention because no particles are being embedded in the present invention as claimed in claim 1. Claim 1 requires that the particles remove the plastic-type material and bind to the substrate below, thus there is no "embedding" occurring.

Van Steenkiste et al. teaches a kinetic spray method, again for coating a metal substrate with a metal. Van Steenkiste et al. provides two tables of data all of which are metal particles applied to a metal substrate, brass. There is no suggestion, teaching, or motivation within any of the references for combining Rayburn, Tawfik et al., and Van Steenkiste et al. Even when combined at most all the combination teaches is that a metal substrate can be **directly coated** with metal particles either by a thermal spray process or a kinetic spray process. None of the references discuss or suggest that the kinetic spray process can be used to spray through a plastic-type coating to remove it and then bind to the substrate under it.

Claim 1 requires using particles with an average nominal diameter of from 60 to 250

microns in a kinetic spray process. In the process a mask is pressed against a substrate material that is covered by a plastic-type material. The mask has at least one opening and the particles entrained in the main gas of the kinetic spray process are directed through the opening. The particles remove the plastic-type material and then bond to the substrate material. Claim 1 furthermore requires that the substrate or the nozzle be moved past the other at a traverse speed of from 70 to 260 millimeters per second. Van Steenkiste et al., which is the only relevant reference to the present invention and the only one to discuss kinetic spraying does not provide any information regarding traverse speeds. The Examiner suggests that the traverse speed is mere optimization, however there is no hint in the cited references that traverse speed is a result effective variable. Absent such a suggestion it is not mere optimization to discover the importance of this variable when using a kinetic spray process to firstly remove a cover layer over a substrate and to then bind material to the underlying substrate. Each and every limitation of claim 1 is not taught by nor made obvious by the combination of Ray burn, Tawfik et al., and Van Steenkiste et al.

In summary, the Examiner can point to no suggestions, teachings, or motivations within the cited references for combining the cited references other than use of the Applicants' invention as a template for locating the references. Even when combined the cited references fail to teach or make obvious each and every limitation of independent claim 1. The references Rayburn, Tawfik et al., and Van Steenkiste et al. at most **teach directly coating** a metal substrate with a metal either by a thermal spray or a kinetic spray process. Hathaway teaches using masking tape adhesively applied to a dielectric as a mask, sandblasting grooves in the dielectric, and then filling the sandblast formed groove by a thermal spray process. None alone or in combination teach or make obvious a kinetic spray process for coating a plastic covered substrate with particles having a size of from 60 to 250 microns that are kinetically sprayed

wherein the particles pass through openings in a mask pressed against the plastic covering, the sprayed particles first removing the plastic material and then bonding to the substrate and wherein the substrate and nozzle are moved relative to each other at a speed of from 70 to 260 millimeters per second as required by claim 1. Thus, the rejection of claims 1-6 and 9-11 under 35 U.S.C. § 103(a) based on Rayburn, Tawfik et al., Van Steenkiste et al. and Hathaway is improper and must be withdrawn.

B. Rejection of claim 7 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste et al. (US 6283386), Hathaway (US 2599710), and Martyniak (US 4263341).

The Examiner's rejection of claim 7, which depends from claim 1, based on Rayburn, in view of Tawfik et al., Van Steenkiste et al., Hathaway, and Martyniak is likewise improper. The Examiner relies in Rayburn, Tawfik et al., Van Steenkiste et al. and Hathaway as described above. This reliance is misplaced as discussed above and Martyniak does not correct the failures of these references. The Examiner relies on Martyniak for teaching a mask of stainless steel. Martyniak again teaches another use of thermal spray again to directly coat a metal substrate with a metal. For reasons discussed above the references fail to teach or make obvious each and every limitation of claim 1 and claim 7. Thus, the rejection of claim 7 under 35 U.S.C. § 103(a) based on Rayburn, Tawfik et al., Van Steenkiste et al., Hathaway, and Martyniak is improper and must be withdrawn.

C. Rejection of claim 8 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste et al. (US 6283386), Hathaway (US 2599710), and Kashirin et al. (US 6402050).

The Examiner's rejection of claim 8, which depends from claim 1, based on Rayburn, in view of Tawfik et al., Van Steenkiste et al., Hathaway, and Kashirin et al. is likewise improper.

The Examiner relies in Rayburn, Tawfik et al., Van Steenkiste et al. and Hathaway as described above. The Examiner relies on Kashirin et al. as teaching entraining the particles in the flow of the gas in the diverging region of the supersonic nozzle. For the reasons discussed above Rayburn, Tawfik et al., Van Steenkiste et al., and Hathaway can not properly be combined and even if combined they do not make claim 1 obvious. Kashirin et al. does not overcome this failure. Kashirin et al. does not even disclose a single example of using the process to coat any substrate. Kashirin et al. does not discuss traverse speeds and it certainly does not make it obvious alone or in combination with the other references to use a kinetic spray process to spray through a mask pressed against a plastic coated substrate to remove the plastic coating and then bind to the exposed substrate wherein the particles are entrained in the diverging region of the nozzle as required by claim 8. Thus, the rejection of claim 8 based on the cited references is improper and must be withdrawn.

D. Rejection of claims 1-6 and 9-11 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste (US 6623796) and Hathaway (US 2599710).

The Examiner also rejected claims 1-6 and 9-11 under 35 U.S.C. § 103 (a) based on Rayburn in view of Tawfik et al., Van Steenkiste (US 6623796), and Hathaway. This rejection can not be sustained for the reasons noted above with respect to the combination of Rayburn, Tawfik et al., Van Steenkiste et al ('386) and Hathaway. All that Van Steenkiste ('796) adds to Van Steenkiste et al. ('386) is use of particles having an average nominal diameter of up to 250 microns. It does not correct the failures of the combination of Rayburn with Tawfik et al., Van Steenkiste et al. ('386), and Hathaway to teach or make obvious every limitation of claim 1. The new combination also does not teach or make obvious the present invention which teaches that the kinetic spray process can be used to spray particles through a mask onto a plastic covered

substrate, thereby removing the plastic cover and binding to the substrate beneath using a traverse speed of from 70 to 260 millimeters per second. Van Steenkiste ('796) has no discussion of any traverse speeds.

E. Rejection of claim 7 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste (US 6623796), Hathaway (US 2599710), and Martyniak (US 4263341).

As noted above the only difference between Van Steenkiste et al. ('386) and Van Steenkiste ('796) is that Van Steenkiste ('796) discloses use of particles up to 250 microns. Thus, for the reasons discussed above in section B, the rejection of claim 7 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste (US 6623796), Hathaway (US 2599710), and Martyniak (US 4263341) can not be sustained and must be withdrawn.

F. Rejection of claim 8 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste (US 6623796), Hathaway (US 2599710), and Kashirin et al. (US 6402050).

As noted above the only difference between Van Steenkiste et al. ('386) and Van Steenkiste ('796) is that Van Steenkiste ('796) discloses use of particles up to 250 microns. Thus, for the reasons discussed above in section C, the rejection of claim 8 based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste (US 6623796), Hathaway (US 2599710), and Kashirin et al. (US 6402050) can not be sustained and must be withdrawn.

G. Rejection of claims 12-16 and 18-20 under 35 U.S.C. § 103(a) as unpatentable over Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), and Van Steenkiste (US 6623796).

The Examiner rejected claims 12-16 and 18-20 under 35 U.S.C. § 103(a) as unpatentable over Rayburn in view of Tawfik et al., and Van Steenkiste (US 6,623,796). This combination can not be made for the reasons noted above with respect to Van Steenkiste at al. (US 6,283,386) as used against claim 1. The Examiner relies on Van Steenkiste '796 with respect to claim 12 and those that depend therefrom because claim 12 includes as a limitation particles having an average nominal diameter of from 250 to 1400 microns. Van Steenkiste et al. '386 is limited to particles of from 60 to 106 microns while Van Steenkiste '796 teaches use of particles having an average nominal diameter of up to 250 microns in a kinetic spray process. Again Van Steenkiste '796 is deficient because like Rayburn and Tawfik et al. **it only teaches coating a metal directly with a metal**. In addition, Van Steenkiste '796 teaches that particles size must be no larger than 250 microns. Finally, Van Steenkiste '796 does not disclose any traverse speeds of the nozzle relative to the substrate as required by claim 12. There is no suggestion or teaching in any of the references alone or in combination that would make it obvious to one of ordinary skill in the art that a kinetic spray process could be used to spray particles having an average nominal diameter of from 250 to 1400 microns through a plastic-type covering and have them bond to a substrate beneath the plastic using a traverse speed of from 70 to 260 millimeters per second as required by claim 12. As discussed above Rayburn and virtually all of Tawfik et al. is directed to a thermal spray process, which is a completely different principal from kinetic spraying. The present invention requires spraying the particles such that they penetrate through a plastic-type covering and bond to the substrate underneath using a traverse speed of from 70 to 260 millimeters per second which is not obvious based on the cited references. In summary, the rejection of claim 12 and the claims which depend therefrom under 35 U.S.C. § 103(a) based on Rayburn in view of Tawfik et al. and Van Steenkiste is improper and must be withdrawn.

H. Rejection of claim 17 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste (US 6623796) and further in view of Kashirin et al. (US 6402050).

The Examiner rejected claim 17 under 35 U.S.C. § 103(a) based on Rayburn in view of Tawfik et al., Van Steenkiste and further in view of Kashirin et al. The rejection of claim 12, which claim 17 depends from, based on Rayburn, Tawfik et al. and Van Steenkiste is improper for the reasons noted above. All Kashirin et al. adds is the disclosure of entraining the particles after the throat of the supersonic nozzle. It does not even discuss the particle sizes, it does not suggest that the process can be use to coat a substrate having an overlay of a plastic material, and there is no disclosure of a traverse speed. Thus, because the cited references do not alone or in combination make all the limitations of claim 17 obvious, the rejection of claim 17 under 35 U.S.C. § 103(a) based on the cited references is improper and must be withdrawn.

I. Rejection of claims 21-22 under 35 U.S.C. § 103(a) based on Rayburn (US 3731354) in view of Tawfik et al. (US 2004/0101738), Van Steenkiste (US 6623796) and further in view of Martyniak (US 4263341).

The Examiner rejected claims 21-22 under 35 U.S.C. § 103(a) based on Rayburn in view of Tawfik et al., Van Steenkiste and further in view of Martyniak. As discussed above the combination of Rayburn, Tawfik et al., and Van Steenkiste does not make all the limitations of claim 12 obvious. Claims 21 and 22 depend from claim 12 and Martyniak does not supplement the deficiencies of Rayburn, Tawfik et al. and Van Steenkiste. The combination does not teach using a kinetic spray process to spray particles having an average nominal diameter of from 250 to 1400 microns through an opening in a mask toward a plastic covered material to drive the particles through the plastic to bind to the substrate beneath using a traverse speed of from 70 to 2160 millimeters per second. Thus, the rejection of claims 21-22 under 35 U.S.C. § 103 (a)

based on Rayburn, Tawfik et al., Van Steenkiste, and Martyniak should be withdrawn.

Respectfully submitted,

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October 4, 2005
Date

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CERTIFICATE OF EXPRESS MAILING

I hereby certify that the attached Appeal Brief for application serial number 10/812,.861 filed March 30, 2004 is being deposited with the United States Postal Service as Express Mail EV 564947285 US in an envelope addressed to Mail Stop Appeal Brief – Patents, Commissioner of Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450, on this **October 4, 2005**.

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VIII. Claims appendix

1. (Previously presented) A method of kinetic spray coating a substrate (116) covered by a plastic-type material (112, 114) comprising the steps of:

a) providing particles of a material to be sprayed having an average nominal diameter of from 60 to 250 microns;

b) providing a supersonic nozzle (54) having a converging region (56) connected to a diverging region through a throat (58);

c) providing a substrate material (116) covered by a plastic-type material (112, 114) and positioned opposite the nozzle (54);

d) providing a mask (118, 122) having at least one opening (120) therein, pressing the mask (118, 122) against the plastic-type material (112, 114);

e) directing a flow of a heated main gas through the nozzle (54); and

f) kinetic spraying the particles by entraining the particles in the flow of the heated main gas and accelerating the particles to a velocity sufficient to result in the particles passing through the opening (120) in the mask (118,122) and removing the plastic-type material (112) and then adhering to the substrate material (116) upon impact, wherein one of the substrate material (116) and the nozzle (54) are moved relative to the other of the substrate material (116) and the nozzle (54) at a traverse speed of from 70 to 260 millimeters per second.

2. (Original) The method as recited in claim 1, wherein the particles comprise either tin, tin alloys, aluminum, aluminum alloys, silver, silver alloys, gold, gold alloys, lead, lead alloys, zinc, zinc alloys, or a mixture thereof.

3. (Original) The method as recited in claim 1, wherein the substrate material (116) comprises at least one electrical conductor material.

4. (Original) The method as recited in claim 1, wherein the substrate material (116) comprises a flexible electrical circuit.

5. (Original) The method as recited in claim 1, wherein step c) comprises

positioning the substrate material (116) at a distance of from 1.2 to 10 centimeters from an exit end (60) of the nozzle (54).

6. (Original) The method as recited in claim 1, wherein step d) comprises providing a mask comprising an upper mask (118) and a lower mask (122) and sandwiching the substrate material (116) between the upper (118) and lower (122) masks.

7. (Original) The method as recited in claim 1, wherein step d) comprises providing a mask (118, 122) formed from steel, stainless steel, ceramic, a metal, or a mixture thereof.

8. (Original) The method as recited in claim 1, wherein step f) comprises entraining the particles in the flow of the gas at a point in the diverging region.

9. (Original) The method as recited in claim 1, wherein step f) comprises accelerating the particles to a velocity of from 100 to 1200 meters per second.

10. (Cancelled)

11. (Original) The method as recited in claim 1, wherein step e) comprises providing a heated main gas having a temperature of from about 315 to 710 degrees Celsius.

12. (Previously presented) A method of kinetic spray coating a substrate (86, 92) covered by a plastic-type material (82, 84, 90) comprising the steps of:

a) providing particles of a material to be sprayed having an average nominal diameter of from 250 to 1400 microns;

b) providing a supersonic nozzle (54) having a converging region (56) connected to a diverging region through a throat (58);

c) providing a substrate material (86, 92) covered by a plastic-type material (82, 84, 90) and positioned opposite the nozzle (54);

d) directing a flow of a heated main gas through the nozzle (54); and

e) kinetic spraying the particles by entraining the particles in the flow of

the heated main gas and accelerating the particles to a velocity sufficient to result in the particles passing through the plastic-type material (82, 84, 90) and adhering to the substrate material (86, 92) upon impact, wherein one of the substrate material (86, 92) and the nozzle (54) are moved relative to the other of the substrate material (86, 92) and the nozzle (54) at a traverse speed of from 70 to 260 millimeters per second.

13. (Original) The method as recited in claim 12, wherein the particles comprise either tin, tin alloys, aluminum, aluminum alloys, silver, silver alloys, gold, gold alloys, lead, lead alloys, zinc, zinc alloys, or a mixture thereof.

14. (Original) The method as recited in claim 12, wherein the substrate material (86, 92) comprises at least one electrical conductor material.

15. (Original) The method as recited in claim 12, wherein the substrate material (86, 92) comprises a flexible electrical circuit.

16. (Original) The method as recited in claim 12, wherein step c) comprises positioning the substrate material (86, 92) at a distance of from 3.5 to 15 centimeters from an exit end (60) of the nozzle (54).

17. (Original) The method as recited in claim 12, wherein step e) comprises entraining the particles in the flow of the gas at a point in the diverging region.

18. (Original) The method as recited in claim 12, wherein step e) comprises accelerating the particles to a velocity of from 100 to 1200 meters per second.

19. (Cancelled)

20. (Original) The method as recited in claim 12, wherein step d) comprises providing a heated main gas having a temperature of from about 315 to 710 degrees Celsius.

21. (Original) The method as recited in claim 12, further comprising providing a mask (118, 122) having at least one opening (120) therein and positioned between the nozzle (54) and the substrate material (86, 92) and directing the particles through the opening (120).

22. (Original) The method as recited in claim 21, wherein the mask (118, 122) is formed from steel, stainless steel, ceramic, a metal, or a mixture thereof.

IX. Evidence appendix

X. Related proceedings index

None.

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